THE GENUS TRICHOPHAEOPSIS[1]

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Trichophaea bicuspis (Boudier) Boudier, a most unusual Operculate Discomycete with two-pronged setae, was apparently first reported for North America by the senior author in a paper read before the annual meeting of the Mycological Society of America in September, 1948. Two American collections were reported at that time, and the species has continued to intrigue him ever since, in that it differs significantly from most other species of the genus *Trichophaea* in several respects. He suggested to Mme Marcelle Le Gal while at Paris shortly thereafter that a new genus to accommodate this species would be appropriate, but deferred to her opinion that the species would be best left in *Trichophaea,* at least for the time being. He then prepared a manuscript covering his studies on the species, when a request from Dr. Bessie B. Kanouse for the loan of herbarium material of this species alerted him to the fact that she was undertaking a monographic revision of the genus. His manuscript, notes, and specimens were all turned over to Dr. Kanouse for her use, and were mentioned in her studies (Kanouse, *1958*). She, too, retained the species in *Trichophaea,* though she stressed many of the characters which now lead us to propose this species as the type of a new, monotypic genus.

The ectal excipulum of *T. bicuspis* is very characteristic, being composed of vertically oriented rows of cells, the individual cells rather short, glued together to form a one-cell-thick tissue or "skin" seen as large, plate-like structures in squash mounts. Though Kanouse noted that "Boudier did not emphasize sufficiently the peculiar exciple," a character not even mentioned in the original description (Boudier, *1896*), he did faithfully illustrate these unusual cells in his later publication (Boudier, *1905-10:* pl. 366). Such a one-cell-thick "skin" of agglutinated cells is known to us in only one other member of the Pezizales, *Rhizoblepharia neotropica* Erb & Korf in Erb (and probably also in the type species of that genus, *R. jugispora* Rifai). The studies of *R. neotropica* by the junior author (Erb, *1972*) led us to restudy *T. bicuspis,* which we are now convinced belongs to a genus close to, but distinct from, *Rhizoblepharia,* and like that genus

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referable to the Pseudombrophileae (Pyronemataceae, Ascophanoideae).

The dark brown setae of this species are diagnostic. The stiff, upward-pointing end is prolonged below into usually a short to rather long spur or branch, borne nearly in direct line with the apical part, so that at first glance the seta appears to be pointed at both ends. On rare occasions the seta may lack a basal prong, or even have two such spurs. Setae of this type are unknown elsewhere among the Discomycetes.

In addition to the setae, there are also present on the apothecial surface many other hairs apparently overlooked by all previous workers. These are of varying color from collection to collection, nearly hyaline in some specimens, but brown to almost black in others, and are much narrower than the setae, more or less flexuous, arising from a somewhat swollen basal, superficial cell, tapering slightly to a almost perfectly cylindrical tube. These hairs are (2-) 3-5 (-6) × (75-) 150-400 (-535) µm, whereas the setae have the apical portion 12-22 × 105-800 µm and the lower prong 12-22 × (0-) 43-250 (-430) µm.

Trichophaea bicuspis is normally considered to have biguttulate ascospores. One of its synonyms, *Lachnella setiformis* Rehm[2], was also described with biguttulate ascospores. When the senior author was unable to demonstrate guttules in the two American collections, he entered into correspondence with Mme Le Gal, who advised him *(pers. comm.)* that guttules are often absent in some collections. She communicated a specimen from the Netherlands (*Daams*, 5. XI. 1947) from her herbarium which purported to show these. Kanouse *(1958)* reported the spores as non-guttulate. Boudier *(1896)* had originally noted: "Les spores très obtuses à chaque ex[t]rémité sont ordinairement avec des granules assez gros rassemblés irrégulièrement aux deux bouts, quand elles sont encore jeunes; mûres, elles sont très réfringentes avec deux grosses sporidioles bien visibles, quoiqu'un peu effacées par suite de la réfringence même." In the explanation of the plate for his Icones Mycologicae, Boudier *(1905-10)* wrote: "Spores ... avec des granulations aux deux extremites quand elles sont jeunes, qui se reunissent en deux gouttelettes bien marquees a leur complete maturite; ..." Grelet *(1939)* likewise commented on the phenomenon of guttule appearance: "Les spores de cette espèce présentent au début, à l'intérieur, des granulations analogues à celles que l'on aperçoit dans les spores de *Trichophaea Boudieri*, mais tandis que dans

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2. Rehm's *(1914)* statement that his *Lachnella setiformis* "... wurde bisher von mir als zugehörig zu *Lachnea livida* (Schum.) Gill. erachtet, cfr. Rehm Discom. p. 1065" is apparently in error. In examining Rehm collections at Stockholm in 1949, the senior author encountered two specimens from Wagner: (1) *Lachnea livida* (Schum.) Sacc. a. Nadelholzstock, gr. Winterberg. G. Wagner. Herbst 1885. [det. Rehm]; (2) 27. *Lachnea Rehmiana* Wagner nov. spec! a. faulenden *Ochroporus fomentarius*, gr. Winterberg. G. Wagner. V. 1894. [redet. Rehm as *Lachnea livida* (Schum.)]. These appear to be the collections mentioned by Rehm (*1895:* 1066; *1896:* 1270), but they are quite distinct from *Lachnella setiformis*, and surely not referable to either *Trichophaea* or *Trichophaeopsis*.

cette dernière espèce, les granulations ont plutôt tendence à disparaître avec l'âge, dans les spores de *Tr. bicuspis,* au contraire, les granulations ont tendence à se réunir en amas de plus en plus denses, vers les extrémités, jusqu'à ce que finalement elles se condensent en deux gouttelettes bien marquées."

Our studies have now convinced us that what was reported by Boudier and by Grelet can be found in at least some of our specimens. The youngest spores are usually without any granulations, but soon there appear irregular masses of material, either distinctly granular or of an amorphous nature, usually towards the poles. The spore matures and becomes, as Boudier correctly noted, distinctly refringent, and the contents take on a yellowish cast. The spores recall to us similarly refringent spores in the genus *Fimaria*. Some of the spores will develop one, two, or even more distinct de Bary bubbles (gas inclusions) in concentrated solutions (as also will individual cells of the setae). A single de Bary bubble frequently develops in the ascospores of species of *Trichophaea,* but the only genus known to us in which two dBb's are common is *Coprobia*. None of the previous authors mention having seen dBb's in this species, but we do not believe their reports of biguttulate spores are based on these inclusions. In mature spores one can also make out two, sometimes four, more rarely three or many, fairly distinct globules of the size illustrated by these authors. That these globules or droplets are not the typical oil guttules associated with species of *Trichophaea* is clear from the fact that they fail to absorb Sudan IV dye. We are thus far unable to determine the chemical nature of the globules. Since the ascospores are in fact devoid of oil guttules, the assignment of this species to *Trichophaea,* a genus characterized by the possession of such oil guttules, is open to further question.

The resinous yellow contents of the spores recall only one group of the Pezizineae, the tribe Pseudombrophileae (Korf, *1972*). The setae resemble in some respects the genus *Rhizoblepharia,* being exceptionally thick-walled as in that genus, whereas the hairs and setae of the other genera assigned to the tribe Pseudombrophileae *(Pseudombrophila, Fimaria, Selenaspora, Tricharina)* all tend to be much thinner-walled and, except in *Tricharina,* not acuminate. *Trichophaea bicuspis* occupies an isolated position among the Operculate Discomycetes, and appears to be worthy of a genus of its own. We assume that its closest relative is the genus *Rhizoblepharia*. Since Dr. Kanouse did not utilize the information on additional synonyms of this species uncovered by the senior author in his herbarium studies, a complete synonymy of the species is also provided here, together with a listing of the known published exsiccati.

The apothecia of this species were originally described from soil, but most of the collections are either on decaying leaves or on decorticated wood, or twigs or branches, predominantly of various species of *Populus*. The apothecia open wide when fresh to expose the white hymenium, but on drying close up so that the long bristles usually completely obscure the hymenium, and the apothecium becomes turbinate or even conical. The peculiar excipulum doubtless contributes to this phenomenon.

TRICHOPHAEOPSIS Korf & Erb, gen. nov.

Receptaculum setis crassitunicatis, fuscis, bicuspidatis et pilis tenuitunicatis, flexuosis, hyalinis vel fuscis indutum. Excipulum ectale cellulam unam crassitudine aequans, ex textura prismatica formatum. Asci ad apicem operculati, ad basin in crocam angustati. Ascosporae hyalinae, laeves, juventute materiam granulosam vel amorphosam, maturitate materiam resinaceam luteolam et 2 vel 4 guttulas non oleosas continentes. Holotypus: Ciliaria bicuspis *Boudier.*

Trichophaeopsis bicuspis (Boudier) comb. nov.

≡ *Ciliaria (Trichophaea) bicuspis* Boud., Bull. Soc. Mycol. France *12:* 11. 1896.
  ≡ *Lachnea bicuspis* (Boud.) Sacc. & Syd. *in* Sacc., Syll. Fung. *14:* 757. 1899.
  ≡ *Trichophaea bicuspis* (Boud.) Boud., Icones Mycol. Expl. Planches sér. *3:* 2. 1906.
  ≡ [*Tricharia bicuspis* Boud. in herb.; Kanouse, Mycologia *50:* 138. 1958.]
= *Lachnea eichlerii* Bres. (as *"Eichlerii"*), Ann. Mycol. *1:* 119. 1903.
  ≡ *Tricharia eichlerii* (Bres.) Boud. (as *"Echlerii"*), Hist. Classif. Discom. d'Eur. 57. 1907.
= *Lachnella setiformis* Rehm, Ann. Mycol. *12:* 174. 1914.

PUBLISHED EXSICCATAE: *Jaap,* Fungi sel. exs. *455* (as *Lachnea livida*); *Jaap,* Fungi sel. exs. *876* (as *Lachnella setiformis*); *Rehm,* Asc. *1225* (as *Lachnella setiformis,* ISOTYPE of that name in S-R examined).

OTHER TYPE SPECIMENS EXAMINED: [*Boudier*], ad terram, Montm[orency], 7br 1895, PC-B, LECTOTYPE of *Ciliaria bicuspis,* designated by Korf in Kanouse (*1958:* 138); *Eichler,* ad folia et caules herbarum, [Poland], no number, no date, S-B, HOLOTYPE of *Lachnea eichlerii.*

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GRELET, L.-J. 1939. Les Discomycètes de France d'après la classification de Boudier (Huitième fascicule). Bull. Soc. Bot. Centre-Ouest